



DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[RTID 0648-XC871]

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Marine Site Characterization Surveys in the New York Bight and Central Atlantic

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; issuance of an incidental harassment authorization.

SUMMARY: In accordance with the regulations implementing the Marine Mammal Protection Act (MMPA) as amended, notification is hereby given that NMFS has issued an Incidental Harassment Authorization (IHA) to TerraSond Limited (TerraSond) to incidentally harass marine mammals during marine site characterization surveys in the New York Bight (off of New York and New Jersey) and in the Central Atlantic (from Delaware to North Carolina).

DATES: This authorization is effective from April 1, 2024, through March 31, 2025.

FOR FURTHER INFORMATION CONTACT: Ben Laws, Office of Protected Resources, NMFS, (301) 427-8401. Electronic copies of the application and supporting documents, as well as a list of the references cited in this document, may be obtained online at: www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable. In case of problems accessing these documents, please call the contact listed above.

SUPPLEMENTARY INFORMATION:

Background

The MMPA prohibits the “take” of marine mammals, with certain exceptions. Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*) direct the Secretary of Commerce (as delegated to NMFS) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are proposed or, if the taking is limited to harassment, a notice of a proposed IHA is provided to the public for review.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s) and will not have an unmitigable adverse impact on the availability of the species or stock(s) for taking for subsistence uses (where relevant). Further, NMFS must prescribe the permissible methods of taking and other “means of effecting the least practicable adverse impact” on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stocks for taking for certain subsistence uses (referred to in shorthand as “mitigation”); and requirements pertaining to the mitigation, monitoring and reporting of the takings are set forth. The definitions of all applicable MMPA statutory terms cited above are included in the relevant sections below.

Summary of Request

On May 19, 2022, NMFS received a request from TerraSond for an IHA to take marine mammals incidental to site characterization surveys in the New York Bight. Following NMFS’ review of the application, TerraSond submitted a revised version on July 11, 2022, adding additional planned survey activity in the Central Atlantic. This revised application was deemed adequate and complete. TerraSond’s request is for take of 21 species of marine mammals, by Level B harassment only. Neither TerraSond nor

NMFS expect serious injury or mortality to result from this activity and, therefore, an IHA is appropriate. There are no changes from the proposed IHA to the final IHA.

Description of Activity

Overview

TerraSond plans to conduct marine site characterization surveys, including high-resolution geophysical (HRG) surveys, off the coasts of New Jersey and New York (New York Bight) and from Delaware to North Carolina (Central Atlantic). The former portion of survey effort would be conducted on Bureau of Ocean Energy Management (BOEM) Lease Areas OCS-A 0539, 0541, and 0542, while the latter portion of survey effort would be conducted in continental shelf waters of BOEM's Central Atlantic Call Area. The planned survey effort would be conducted in support of wind energy development.

NMFS notes that, on November 16, 2022, BOEM announced eight draft Wind Energy Areas (WEAs), covering approximately 1.7 million acres (688,000 hectares), in the Central Atlantic for public review and comment. The eight draft WEAs represent a subset of the original 3.9 million acres of the Call Area that the Department of the Interior announced for public comment in April 2022. Therefore, TerraSond's actual survey effort in the Central Atlantic, which would be dictated by commercial interest, is likely to be less than that described in its application.

The planned marine site characterization survey effort is designed to obtain data sufficient to meet BOEM guidelines for providing geophysical, geotechnical, and geohazard information for site assessment plan surveys and/or construction and operations plan development. The objective of the surveys is to acquire data on bathymetry, seafloor morphology, subsurface geology, environmental/biological sites, seafloor obstructions, soil conditions, and locations of any man-made, historical or archaeological resources within the respective survey areas. Underwater sound resulting from TerraSond's potential site characterization survey activities, specifically HRG

surveys, has the potential to result in incidental take of marine mammals in the form of Level B behavioral harassment.

Dates and Duration

The potential duration of Central Atlantic HRG survey activity is expected to include a maximum of 1,052 survey days (minimum 661 survey days, depending on final survey plan) over the course of the 1-year period of effectiveness for the IHA, with a “survey day” defined as a 24-hour (hr) activity period in which active acoustic sound sources are used. The potential duration of New York Bight survey activity is expected to include a maximum of 385 survey days. Therefore, the potential total survey days would range from 1,046 to a maximum of 1,437. For both components of the activity, survey activities are anticipated to occur over a minimum of 6-8 months using multiple vessels concurrently and likely throughout most of a year. TerraSond plans to start survey activity as soon as possible, with the IHA effective for a period of 1 year.

Specific Geographic Region

The planned survey activities will occur within the aforementioned BOEM Central Atlantic Call Area and within BOEM’s Lease Areas OCS-A 0539, 0541, and 0542 in the New York Bight. Please see Figures 1 and 2 below or, for color versions, see the same figures in TerraSond’s application. The Central Atlantic survey area comprises approximately 11,500 square kilometers (km²), covering water depths from 20-60 meters (m), and the New York Bight survey area comprises approximately 1,171 km², covering water depths from 30-65 m. As mentioned above, based on BOEM’s contraction of the likely wind energy development area (relative to the initial proposed Call Area), it is likely that actual survey effort in the Central Atlantic may be less than that described in TerraSond’s application.

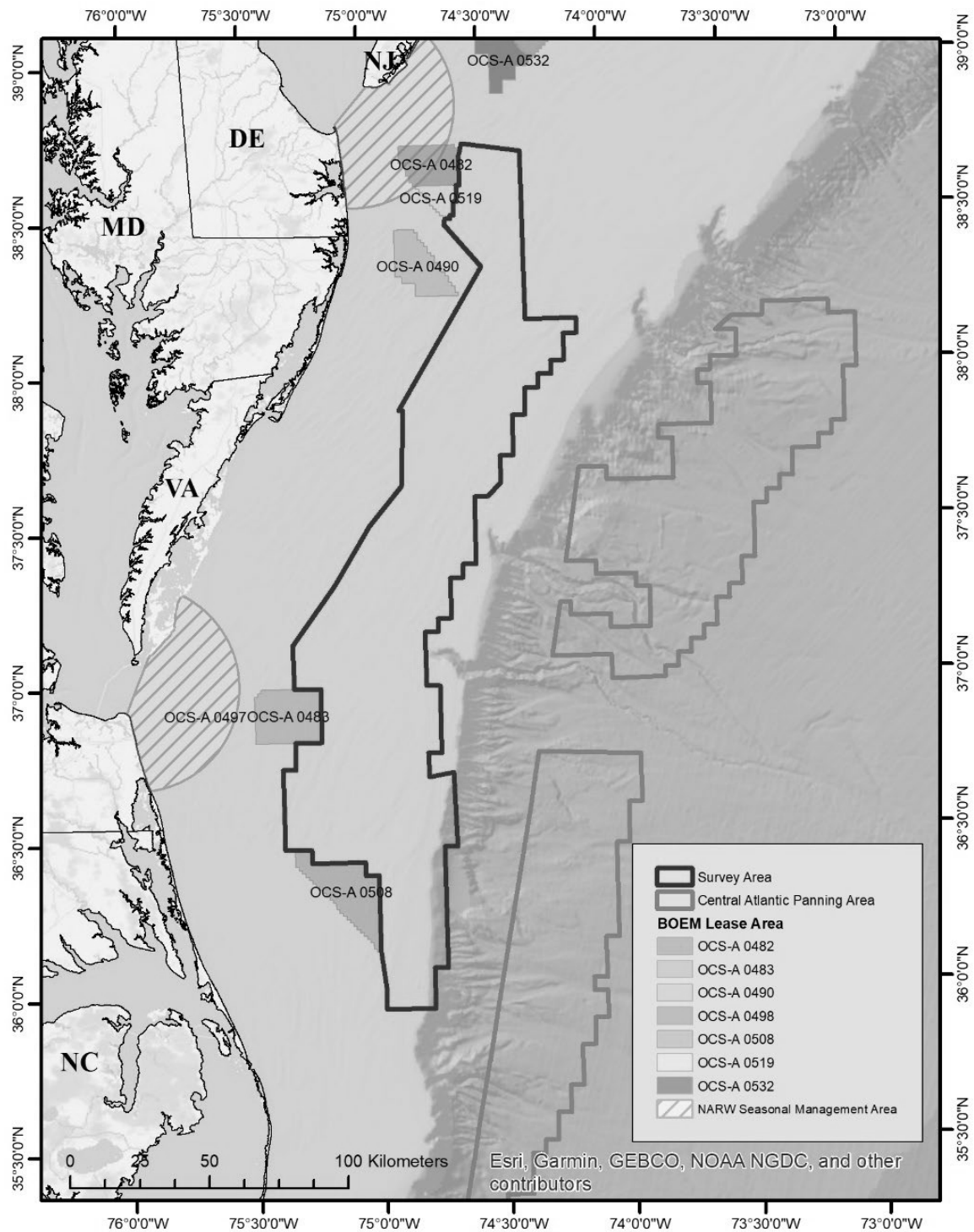


Figure 1 -- Central Atlantic Site Characterization Survey Location

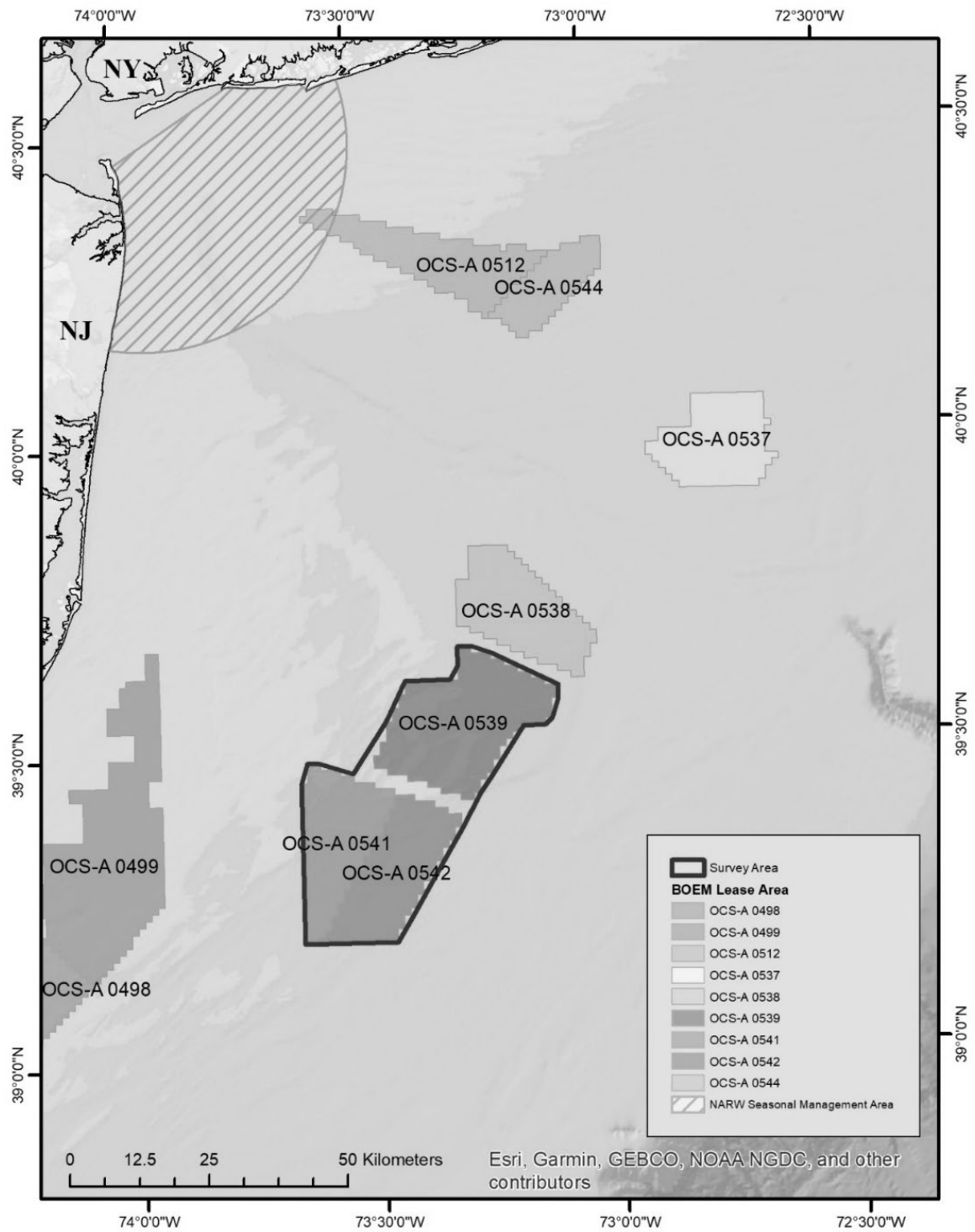


Figure 2 -- New York Bight Site Characterization Survey Location

Detailed Description of Specific Activity

TerraSond plans to conduct HRG survey operations, including multibeam depth sounding, seafloor imaging, and shallow and medium penetration sub-bottom profiling. The HRG surveys may be conducted using any or all of the following equipment types: side scan sonar, multibeam echosounder, gradiometers, parametric sub-bottom profiler, or sparkers. TerraSond assumes that HRG survey operations would be conducted 24 hours per day, with an assumed daily survey distance of 100 km. This average distance per day was calculated by TerraSond from the maximum achievable survey distance assuming 24-hour survey operations and an average vessel speed of 3.5 knots (kn) (6.5 km/hour), and then reducing from there based on prior experience to account for expected downtime related to weather, equipment malfunction, and other factors.

The only acoustic source planned for use during HRG survey activities planned by TerraSond with expected potential to cause incidental take of marine mammals is the sparker. Sparkers are medium penetration, impulsive sources used to map deeper subsurface stratigraphy, and which may be operated with different numbers of electrode tips to allow tuning of the acoustic waveform for specific applications. Sparkers create omnidirectional acoustic pulses from 50 Hz to 4 kHz, and are typically towed behind the vessel. The sparker system planned for use is the Applied Acoustics Dura-Spark Ultra-High Resolution Seismic (UHRS) 400 + 400 (electrode tips) source, which is essentially two of the same Applied Acoustics Dura-Spark sources stacked on top of each other creating two “decks” to the sparker. However, the decks will not be discharged simultaneously, but will be used in an alternating “flip-flop” pattern (as discussed below). Thus, for all source configurations below, the maximum power expected when discharging the sparker source (single deck) will be 800 joules (J). Crocker and Fratantonio (2016) measured the Applied Acoustics Dura-Spark, but did not provide data for an energy setting near 800 J (for a 400-tip configuration, Crocker and Fratantonio

(2016) provide measurements at 500 and 2,000 J). Therefore, TerraSond uses a similar alternative system, which was measured with an input voltage of 750 J, as a surrogate for purposes of analysis. NMFS concurs with this selection, which is described in Table 1.

Table 1 -- Summary of Representative HRG Equipment

Equipment	Operating Frequency (kHz)	SL _{rms} (dB re 1 μ Pa m)	SL _{0-pk} (dB re 1 μ Pa m)	Pulse Duration (width) (millisecond)	Repetition Rate (second)	Beamwidth (degrees)
SIG ELC 820 sparker (750 J) ¹	0.3–1.2	203	213	1.1	0.25	Omni

μ Pa = micropascal; dB = decibel; Omni = omnidirectional source; re = referenced to; PK = zero-to-peak sound pressure level; SL = source level; SPL = root-mean-square sound pressure level.

¹Proxy for Applied Acoustics Dura-Spark UHRS (800 J).

Central Atlantic—The Central Atlantic activity component includes two different survey phases that may occur involving different survey line spacing and potential survey equipment tow configurations. There are two possible survey methods that may be used during Phase 1, which the applicant refers to as Alternative 1 and Alternative 2.

Alternative 1 would involve the use of a single source vessel towing one sparker source composed of two “decks” of 400 electrode tips each stacked on top of each other. The two decks would be discharged in alternating fashion such that only one deck is discharged at a time. Alternative 2 would involve the use of a single source vessel towing 3 of the same sparker sources with a horizontal separation between the sources of 150 m. Alternative 1 describes acquisition along 58,607 km of trackline, while Alternative 2 describes acquisition along 19,536 km of trackline. Only one of these two methods will be used for survey acquisition. Phase 2 will involve a single vessel towing two of the same sparker sources with a horizontal separation between the sources of 30 m, and includes acquisition along 46,573 km of trackline. At an assumed 100 km per day, Phase 1 would require approximately 586 or 195 days, depending on which alternative is ultimately used, and Phase 2 will require approximately 466 days. Therefore, based on

the description provided by TerraSond, the Central Atlantic portion of the survey effort is expected to require either 661 or 1,052 survey days. Up to a total of four source vessels may be active concurrently to accomplish this.

New York Bight—The New York Bight activity component includes three different survey phases that may occur involving different survey line spacing and potential survey equipment tow configurations. Phase 1 involves the use of a single source vessel towing one sparker source composed of two “decks” of 400 electrode tips each stacked on top of each other. As discussed above, the two decks will typically be discharged in alternating fashion such that only one deck is discharged at a time. Phases 2 and 3 involve a single vessel towing two of the same sparker sources with a horizontal separation between the sources of 30 m. These Phases involve acquisition along 14,833, 200, and 23,311 km of trackline, respectively, requiring a total of approximately 385 days. Up to a total of three source vessels may be active concurrently to accomplish this.

Further detail regarding the planned HRG surveys is provided in the **Federal Register** notice for the proposed IHA (87 FR 66658; November 4, 2022). Since that time, no changes have been made to the planned HRG survey activities. Required mitigation, monitoring, and reporting measures are described in detail later in this document (please see **Mitigation and Monitoring and Reporting**).

Comments and Responses

A notice of NMFS’ proposal to issue an IHA to TerraSond was published in the **Federal Register** on November 4, 2022 (87 FR 66658) for a 30-day comment period. That notice described, in detail, TerraSond’s planned activities, the marine mammal species that may be affected by the activities, and the anticipated effects on marine mammals. In that notice, we requested public input on the request for authorization described therein, our analyses, the proposed authorization, and other aspects of the

notice of proposed IHA, and requested that interested persons submit relevant information, suggestions, and comments.

NMFS received two comment letters from private citizens, expressing general opposition to issuance of the IHA or to the underlying associated activities. The comments received suggested that NMFS should not issue the IHA, but without providing information relevant to NMFS' decision. We reiterate here that NMFS' proposed action concerns only the authorization of marine mammal take incidental to the planned surveys—NMFS' authority under the MMPA does not extend to the surveys themselves, or to wind energy development more generally. Further, NMFS does not have discretion regarding issuance of requested incidental take authorizations pursuant to the MMPA, assuming: (1) the total taking associated with a specified activity will have a negligible impact on the affected species or stock(s); (2) the total taking associated with a specified activity will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (not relevant here); (3) the total taking associated with a specified activity is small numbers of marine mammals of any species or stock; and (4) appropriate mitigation, monitoring, and reporting of such takings are set forth, including mitigation measures sufficient to meet the standard of least practicable adverse impact on the affected species or stocks. In addition, one commenter suggested that issuance of the proposed IHA could result in the death of “whales.” We reiterate here that no mortality is anticipated or authorized, and note that the commenter did not provide any specific information supporting this concern.

NMFS also received letters from two non-governmental organizations, Oceana and the Southern Environmental Law Center (SELC), and from the Delaware Department of Natural Resources and Environmental Control (DNREC). SELC's comments were submitted on behalf of an additional nine organizations. All substantive comments, and NMFS' responses, are provided below, and all letters are available online at:

<https://www.fisheries.noaa.gov/action/incidental-take-authorization-terrasond-limited-marine-site-characterization-surveys-new>. Please review the letters for full details regarding the comments and underlying justification.

Comment: Oceana raised objections to NMFS' proposed renewal process for potential extension of the 1-year IHA with an abbreviated 15-day public comment period. Oceana recommended that an additional 30-day public comment period is necessary for any IHA renewal request.

Response: NMFS' IHA renewal process meets all statutory requirements. In prior responses to comments about IHA renewals (*e.g.*, 84 FR 52464, October 2, 2019 and 85 FR 53342, August 28, 2020), NMFS explained the IHA renewal process is consistent with the statutory requirements contained in section 101(a)(5)(D) of the MMPA, and further, promotes NMFS' goals of improving conservation of marine mammals and increasing efficiency in the MMPA compliance process. Therefore, we intend continue to implement the existing renewal process.

All IHAs issued, whether an initial IHA or a renewal, are valid for a period of not more than one year. And the public has 30 days to comment on proposed IHAs, with a cumulative total of 45 days for IHA renewals. The notice of the proposed IHA published in the **Federal Register** on November 4, 2022 (87 FR 66658) provided a 30-day public comment period and made clear that NMFS was seeking comment on the proposed IHA and the potential issuance of a renewal for this survey. As detailed in the **Federal Register** notice for the proposed IHA and on the agency's website, eligibility for renewal is determined on a case-by-case basis, renewals are subject to an additional 15-day public comment period, and the renewal is limited to up to another year of identical or nearly identical activities as described in the **Description of Proposed Activities** section of the proposed IHA notice or the activities described in the **Description of Proposed Activities** section of the proposed IHA notice would not be completed by the time the

IHA expires and a renewal would allow for completion of the activities beyond that described in the *Dates and Duration* section of this notice. NMFS' analysis of the anticipated impacts on marine mammals caused by the applicant's activities covers both the initial IHA period and the possibility of a 1-year renewal. Therefore, a member of the public considering commenting on a proposed initial IHA also knows exactly what activities (or subset of activities) would be included in a proposed renewal IHA, the potential impacts of those activities, the maximum amount and type of take that could be caused by those activities, the mitigation and monitoring measures that would be required, and the basis for the agency's negligible impact determinations, least practicable adverse impact findings, small numbers findings, and (if applicable) the no unmitigable adverse impact on subsistence use finding—all the information needed to provide complete and meaningful comments on a possible renewal at the time of considering the proposed initial IHA. Reviewers have the information needed to meaningfully comment on both the immediate proposed IHA and a possible 1-year renewal, should the IHA holder choose to request one.

While there would be additional documents submitted with a renewal request, for a qualifying renewal these would be limited to documentation that NMFS would make available and use to verify that the activities are identical to those in the initial IHA, are nearly identical such that the changes would have either no effect on impacts to marine mammals or decrease those impacts, or are a subset of activities already analyzed and authorized but not completed under the initial IHA. NMFS would also need to confirm, among other things, that the activities would occur in the same location; involve the same species and stocks; provide for continuation of the same mitigation, monitoring, and reporting requirements; and that no new information has been received that would alter the prior analysis. The renewal request would also contain a preliminary monitoring report, in order to verify that effects from the activities do not indicate impacts of a scale

or nature not previously analyzed. The additional 15-day public comment period, which includes NMFS' direct notice to anyone who commented on the proposed initial IHA, provides the public an opportunity to review these few documents, provide any additional pertinent information, and comment on whether they think the criteria for a renewal have been met. Combined together, the 30-day public comment period on the initial IHA and the additional 15-day public comment period on the renewal of the same or nearly identical activities, provides the public with a total of 45 days to comment on the potential for renewal of the IHA.

In addition to the IHA renewal process being consistent with all requirements under section 101(a)(5)(D), it is also consistent with Congress' intent for issuance of IHAs to the extent reflected in statements in the legislative history of the MMPA. Through the description of the process and express invitation to comment on specific potential renewals in the Request for Public Comments section of each proposed IHA, the description of the process on NMFS' website, further elaboration on the process through responses to comments such as these, posting of substantive documents on the agency's website, and provision of 30 or 45 days for public review and comment on all proposed initial IHAs and renewals respectively, NMFS has ensured that the public is "invited and encouraged to participate fully in the agency's decision-making process," as Congress intended.

Comment: Oceana stated that NMFS must utilize the best available scientific evidence, and suggested that NMFS has not done so, specifically referencing information regarding the North Atlantic right whale (NARW) such as updated population estimates, habitat usage in the survey area, and seasonality information. Oceana specifically asserted that NMFS is not using the best available scientific evidence with regards to the NARW population estimate.

Response: NMFS agrees the best available scientific evidence should be used for assessing NARW abundance estimates. Following the recent publication of NMFS' draft 2022 Stock Assessment Reports (SAR), NMFS updated the information relied upon herein accordingly. In prior responses to comments, NMFS has found that the SAR is the best available scientific evidence with respect to NARW population estimates (see e.g., 87 FR 25452). We find no reason to reconsider or depart from this.

Moreover, the draft 2022 SARs report the same NARW abundance estimate (336) cited by Oceana in its public comment. We further note that this change in abundance estimate does not change the estimated take of NARWs or authorized take numbers, nor does it affect our ability to make the required findings under the MMPA for TerraSond's survey activities.

In sum, NMFS considered the best available scientific evidence regarding both recent habitat usage patterns for the study area and up-to-date seasonality information in the notice of the proposed IHA, including consideration of existing biologically important areas (BIAs) and densities provided by Roberts and Halpin (2022). While the commenter has suggested that NMFS consider best available scientific evidence for recent habitat usage patterns and seasonality, the commenter has not offered any additional scientific information that it suggests should be considered best available scientific evidence.

Comment: Oceana noted that chronic stressors are an emerging concern for NARW conservation and recovery, and stated that chronic stress may result in energetic effects for NARWs. Oceana suggested that NMFS has not fully considered both the use of the area and the effects of both acute and chronic stressors on the health and fitness of NARWs, as disturbance responses in NARWs could lead to chronic stress or habitat displacement, leading to an overall decline in their health and fitness.

Response: NMFS agrees with Oceana that both acute and chronic stressors are of concern for NARW conservation and recovery. We recognize that acute stress from

acoustic exposure is one potential impact of these surveys, and that chronic stress can have fitness, reproductive, *etc.* impacts at the population-level scale. NMFS has carefully reviewed the best available scientific information in assessing impacts to marine mammals, and recognizes that the surveys have the potential to impact marine mammals through behavioral effects, stress responses, and auditory masking. However, NMFS does not expect that the generally short-term, intermittent, and transitory marine site characterization survey activities planned by TerraSond will create conditions of acute or chronic acoustic exposure leading to long-term physiological stress responses in marine mammals. NMFS has prescribed a robust suite of mitigation measures, including extended distance shutdowns for NARW, that are expected to further reduce the duration and intensity of acoustic exposure, while limiting the potential severity of any possible behavioral disruption. The potential for chronic stress was evaluated in making the determinations presented in NMFS' negligible impact analyses. Because NARW generally use this location in a transitory manner, specifically for migration, any potential impacts from these surveys are lessened for other behaviors due to the brief periods where exposure is possible. Thus, the transitory nature of occurrence of NARWs as they migrate means it is unlikely for any exposure to cause chronic effects, as TerraSond's planned survey area and ensonified zones are small relative to the overall migratory corridor. As such, NMFS does not expect acute or cumulative stress to be a detrimental factor to NARWs from TerraSond's described survey activities.

Lastly, NMFS does not find that the effects of TerraSond's survey may contribute to stunted growth rates as suggested by Oceana's comments. The activities associated with TerraSond's survey are outside the scope of activities described in the Stewart et al. (2021) paper, which finds that entanglements in fishing gear are associated with shorter whales. There is no evidence suggesting that the survey activities considered herein could have energetic effects similar to those caused by entanglement in fishing gear. Therefore,

NMFS does not expect stunted growth rates to result from TerraSond's described survey activities.

Comment: Oceana suggests that all vessels associated with the proposed survey should be required to carry and use protected species observers (PSOs), and that PSOs complement their survey efforts using additional technologies, such as infrared detection devices when in low-light conditions.

Response: NMFS finds that it is unnecessary for all survey vessels to use PSOs. PSOs are generally reserved for use onboard acoustic source vessels, where PSOs are responsible for conducting observations, notifying the crew of the need to implement mitigation measures, and recording data. In circumstances similar to those associated with TerraSond's proposed activities, watchstanders are fully capable of conducting watch for purposes of avoiding vessel strike of any objects, including marine mammals. NMFS does, however, agree with Oceana about the use of night vision devices. As such, a requirement to utilize at least one thermal (infrared) imaging device during low-light conditions was included in the proposed **Federal Register** notice. That requirement is included as a requirement of the issued IHA.

Comment: Oceana recommends that NMFS restrict all vessels of all sizes associated with the proposed survey activities to speeds less than 10 kn (18.5 km/hour) at all times due to the risk of vessel strikes to NARWs and other large whales.

Response: While NMFS acknowledges that vessel strikes can result in injury or mortality, we have analyzed the potential for vessel strike resulting from TerraSond's activity and have determined that based on the nature of the activity and the required mitigation measures specific to vessel strike avoidance included in the IHA, potential for vessel strike is so low as to be discountable. The required mitigation measures, all of which were included in the proposed IHA and are now required in the final IHA, include: (1) a requirement that all vessel operators comply with 10 kn (18.5 km/hour) or less

speed restrictions in any SMA, DMA or Slow Zone while underway, and check daily for information regarding the establishment of mandatory or voluntary vessel strike avoidance areas (SMAs, DMAs, Slow Zones) and information regarding NARW sighting locations; (2) a requirement that all vessels greater than or equal to 19.8 m in overall length operating from November 1 through April 30 operate at speeds of 10 kn (18.5 km/hour) or less; (3) a requirement that all vessel operators reduce vessel speed to 10 kn (18.5 km/hour) or less when any large whale, any mother/calf pairs, pods, or large assemblages of non-delphinid cetaceans are observed near the vessel; (4) a requirement that all survey vessels maintain a separation distance of 500 m or greater from any Endangered Species Act (ESA)-listed whales or other unidentified large marine mammals visible at the surface while underway; (5) a requirement that, if underway, vessels must steer a course away from any sighted ESA-listed whale at 10 kn or less until the 500 m minimum separation distance has been established; (6) a requirement that, if an ESA-listed whale is sighted in a vessel's path, or within 500 m of an underway vessel, the underway vessel must reduce speed and shift the engine to neutral; (7) a requirement that all vessels underway must maintain a minimum separation distance of 100 m from all non-ESA-listed baleen whales; and, (8) a requirement that all vessels underway must, to the maximum extent practicable, attempt to maintain a minimum separation distance of 50 m from all other marine mammals, with an understanding that at times this may not be possible (*e.g.*, for animals that approach the vessel). We have determined that the vessel strike avoidance measures in the IHA are sufficient to ensure the least practicable adverse impact on species or stocks and their habitat. Furthermore, no documented vessel strikes have occurred for any marine site characterization surveys, which were issued IHAs from NMFS during the survey activities themselves or while transiting to and from survey sites.

Comment: Oceana suggests that NMFS require vessels maintain a separation distance of at least 500 m from NARWs at all times.

Response: NMFS agrees with Oceana regarding this suggestion and a requirement to maintain a separation distance of at least 500 m from NARWs at all times was included in the proposed **Federal Register** notice and was included as a requirement in the issued IHA.

Comment: Oceana recommended that the IHA should require all vessels supporting site characterization to be equipped with and use Class A Automatic Identification System (AIS) devices at all times while on the water. Oceana suggested this requirement should apply to all vessels, regardless of size, associated with the survey.

Response: NMFS is generally supportive of the idea that vessels involved with survey activities be equipped with and use Class A AIS devices at all times while on the water. Indeed, there is a precedent for NMFS requiring such a stipulation for geophysical surveys in the Atlantic Ocean (83 FR 63268, December 7, 2018); however, these seismic surveys carried the potential for much more significant impacts than the marine site characterization surveys planned by TerraSond. Given the comparatively small footprint of potential effects and correspondingly low level of concern regarding HRG survey activities, NMFS has determined that the operational costs associated with a requirement to so equip vessels not otherwise required to carry AIS are not warranted under the MMPA's least practicable adverse impact standard.

Comment: Oceana asserts that the IHA must include requirements to hold all vessels associated with site characterization surveys accountable to the IHA requirements, including vessels owned by the developer, contractors, employees, and others regardless of ownership, operator, and contract. They state that exceptions and exemptions will create enforcement uncertainty and incentives to evade regulations through reclassification and redesignation. They recommend that NMFS simplify this by

requiring all vessels to abide by the same requirements, regardless of size, ownership, function, contract, or other specifics.

Response: NMFS agrees with Oceana and the proposed IHA and final IHA has general conditions to hold TerraSond and its designees (including vessel operators and other personnel) accountable while performing operations under the authority of the IHA. The plain language of the IHA indicates that the conditions contained therein apply to TerraSond and its designees. The IHA requires that a copy of the IHA must be in the possession of TerraSond, the vessel operators, the lead PSO, and any other relevant designees of TerraSond operating under the authority of this IHA. The IHA also states that TerraSond must ensure that the vessel operator and other relevant vessel personnel, including the PSO team, are briefed on all responsibilities, communication procedures, marine mammal monitoring protocols, operational procedures, and IHA requirements prior to the start of survey activity, and when relevant new personnel join the survey operations.

Comment: Oceana stated that the IHA must include a requirement for all phases of the survey to subscribe to the highest level of transparency, including frequent reporting to federal agencies. Oceana recommends requirements to report all visual and acoustic detections of NARWs and any dead, injured, or entangled marine mammals to NMFS or the Coast Guard as soon as possible and no later than the end of the PSO shift, and also states that to foster stakeholder relationships and allow public engagement and oversight of the permitting, the IHA should require all reports and data to be accessible on a publicly available website.

Response: NMFS agrees with the need for reporting and, indeed, the MMPA calls for IHAs to incorporate reporting requirements. As included in the proposed IHA, the final IHA includes requirements for reporting that supports Oceana's recommendations. TerraSond is required to submit a monitoring report to NMFS within 90 days after

completion of survey activities that fully documents the methods and monitoring protocols, summarizes the data recorded during monitoring. PSO datasheets or raw sightings data must also be provided with the draft and final monitoring report.

Further, the draft IHA and final IHA stipulate that if a NARW is observed at any time by any survey vessels, during surveys or during vessel transit, TerraSond must immediately report sighting information to the NMFS North Atlantic Right Whale Sighting Advisory System within two hours of occurrence, when practicable, or no later than 24 hours after occurrence. TerraSond may also report the sighting to the U.S. Coast Guard. Additionally, TerraSond must report any discoveries of injured or dead marine mammals to the Office of Protected Resources, NMFS, and to the New England/Mid-Atlantic Regional Stranding Coordinator as soon as feasible. This includes entangled animals. All reports and associated data submitted to NMFS are included on the website for public inspection.

Daily visual and acoustic detections of NARWs and other large whale species along the Eastern Seaboard, as well as Slow Zone locations, are publicly available on WhaleMap (<https://whalemap.org/WhaleMap/>). Further, recent acoustic detections of NARWs and other large whale species are available to the public on NOAA's Passive Acoustic Cetacean Map website <https://apps-nefsc.fisheries.noaa.gov/pacm/#/narw>.

Comment: Oceana recommended that NMFS require a visual clearance zone of at least 1,000 m for NARWs around each vessel, and also require an acoustic clearance and exclusion zone of at least 1,000 m for NARWs. In contrast, DNREC commended the use of exclusion zones as proposed by NMFS, but also noted its support for the use of passive acoustic monitoring (PAM) as a supplementary monitoring technique.

Response: NMFS notes that the 500 m shutdown zone for NARWs exceeds the modeled distance to the largest 160 dB Level B harassment isopleth (141 m during sparker use) by a substantial margin. Oceana does not provide a compelling rationale for

why the shutdown zone should be even larger. Given that these surveys are relatively low impact and that, regardless, NMFS has prescribed a NARW shutdown zone that is significantly larger (500 m) than the conservatively estimated largest harassment zone (141 m), NMFS has determined that the shutdown zone is appropriate. Further, Level A harassment is not expected to result even in the absence of mitigation, given the characteristics of the sources planned for use.

Regarding the use of acoustic monitoring to implement the exclusion zones, NMFS does not anticipate that acoustic monitoring would be effective for a variety of reasons discussed below and therefore has not required it in this IHA. As described in the **Mitigation** section, NMFS has determined that the prescribed mitigation requirements are sufficient to effect the least practicable adverse impact on all affected species or stocks.

The commenters do not explain why they expect that PAM would be effective in detecting vocalizing mysticetes, nor does NMFS agree that this measure is warranted, as it is not expected to be effective for use in detecting the species of concern. It is generally accepted that, even in the absence of additional acoustic sources, using a towed passive acoustic sensor to detect baleen whales (including NARWs) is not typically effective because the noise from the vessel, the flow noise, and the cable noise are in the same frequency band and will mask the vast majority of baleen whale calls. Vessels produce low-frequency noise, primarily through propeller cavitation, with main energy in the 5-300 hertz (Hz) frequency range. Source levels range from about 140 to 195 decibel (dB) referenced to 1 micropascal (re 1 μ Pa) at 1 m (NRC, 2003; Hildebrand, 2009), depending on factors such as ship type, load, and speed, and ship hull and propeller design. Studies of vessel noise show that it appears to increase background noise levels in the 71-224 Hz range by 10-13 dB (Hatch *et al.* 2012; McKenna *et al.* 2012; Rolland *et al.* 2012). PAM systems employ hydrophones towed in streamer cables approximately 500 m behind a

vessel. Noise from water flow around the cables and from strumming of the cables themselves is also low frequency and typically masks signals in the same range. Experienced PAM operators participating in a recent workshop (Thode *et al.*, 2017) emphasized that a PAM operation could easily report no acoustic encounters, depending on species present, simply because background noise levels rendered any acoustic detection impossible. The same workshop report stated that a typical eight-element array towed 500 m behind a vessel could be expected to detect delphinids, sperm whales, and beaked whales at the required range, but not baleen whales, due to expected background noise levels (including seismic noise, vessel noise, and flow noise).

Given that the effects to marine mammals from the types of surveys authorized in this IHA are expected to be limited to low level behavioral harassment even in the absence of mitigation, the limited additional benefit anticipated by adding this detection method (especially for NARWs and other low frequency cetaceans, species for which PAM has limited efficacy), and the cost and impracticability of implementing a full-time PAM program, we have determined the current requirements for visual monitoring are sufficient to ensure the least practicable adverse impact on the affected species or stocks and their habitat. NMFS has previously provided discussions on why PAM is not a required monitoring measure during HRG survey IHAs in past **Federal Register** notices (see 86 FR 21289, April 22, 2021, and 87 FR 13975, March 11, 2022, for examples).

Comment: SELC noted that, subsequent to NMFS' publication of the notice of proposed IHA, BOEM made available for public comment eight draft WEAs, and that these draft WEAs, and that these draft WEAs represent a smaller subset of the BOEM Central Atlantic Call Area that formed the basis for TerraSond's planned survey activity. SELC expressed concern regarding the potential that TerraSond's planned survey activity covers an area larger than the draft WEAs. Relatedly, SELC asserted that the same area could be subject to repeated survey efforts by different companies (characterizing these

hypothetical repeated surveys as “redundant”) and expressed concern regarding the potential for cumulative impacts of the activities on NARW.

Response: We first note that BOEM has not yet finalized its draft WEAs following closure of the public comment period on December 16, 2022. Therefore, it is possible that the draft WEAs may yet be expanded to an area more closely approaching the initial Call Area, and NMFS cannot make any judgment regarding the need for, or likelihood of, TerraSond’s proposed survey efforts within the Central Atlantic portion of its planned efforts. As noted previously, however, NMFS expects that the amount of survey effort ultimately conducted by TerraSond will be dictated by commercial interest. As such, NMFS considers it unlikely that TerraSond would in fact conduct survey effort over a significantly larger area than would be available for wind energy development. Regardless, it is not within NMFS’ purview to judge the merits of an applicant’s specified activity. NMFS cannot arbitrarily limit planned effort and has no legitimate means of changing the specified activity absent a conclusion that the activity would have more than a negligible impact. However, NMFS has made the necessary findings under the MMPA for issuance of this IHA.

Regarding the suggestion that future surveys could be conducted over the same area by other entities, NMFS declines to speculate as to the likelihood that such survey effort may be conducted. Neither the MMPA nor NMFS’ codified implementing regulations call for consideration of other unrelated activities and their impacts on populations. Regardless, while NMFS shares the commenter’s concerns regarding NARW, the potential additional surveys described by SELC cannot at this time be considered to be reasonably foreseeable activities.

Comment: SELC expresses concern regarding what it characterizes as inadequate protections for NARW, and reiterates prior recommendations for NMFS to reinitiate its 2021 ESA Programmatic Informal Consultation.

Response: NMFS disagrees with SELC's assertion that existing mitigation protections for NARW are inadequate. SELC does not provide specific recommendations for requirements that it would deem adequate. However, we note that TerraSond is required to implement clearance and exclusion zones of 500 m for NARW. This 500 m zone exceeds the modeled distance to the largest 160 dB Level B harassment isopleth (141 m during sparker use) by a substantial margin. Further, Level A harassment (auditory injury) is not expected to result even in the absence of mitigation, given the characteristics of the sources planned for use. We further note that reinitiation of ESA section 7 consultation is not warranted, as none of the reinitiation triggers listed in NMFS' 2021 programmatic consultation have been met.

Comment: DNREC recommended that TerraSond consider adopting NMFS' proposed changes to the NARW vessel speed rule to further reduce the likelihood of vessel collisions.

Response: As discussed in a previous comment response, NMFS requires substantial measures towards minimizing the risk of vessel strike and has determined that no vessel strike is anticipated to occur.

Description of Marine Mammals in the Area of Specified Activities

Sections 3 and 4 of the application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history of the potentially affected species. NMFS fully considered all of this information, and we refer the reader to these descriptions, incorporated here by reference, instead of reprinting the information. Additional information regarding population trends and threats may be found in NMFS' Stock Assessment Reports (SARs; www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments) and more general information about these species (e.g., physical and

behavioral descriptions) may be found on NMFS' website

Table 2 lists all species or stocks for which take is expected and authorized for this activity, and summarizes information related to the population or stock, including regulatory status under the MMPA and Endangered Species Act (ESA) and potential biological removal (PBR), where known. PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (as described in NMFS' SARs). While no serious injury or mortality is expected to occur, PBR and annual serious injury and mortality from anthropogenic sources are included here as gross indicators of the status of the species or stocks and other threats.

<https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports>.

Common name	Scientific name	Stock	ESA/MMPA status; Strategic (Y/N) ¹	Stock abundance (CV, N _{min} , most recent abundance survey) ²	PBR	Annual M/SI ³
Order Artiodactyla – Infraorder Cetacea – Mysticeti (baleen whales)						

Family Balaenidae						
North Atlantic right whale	<i>Eubalaena glacialis</i>	Western North Atlantic (WNA)	E/D; Y	338 (0; 332; 2020)	0.7	8.1
Family Balaenopteridae (rorquals)						
Humpback whale	<i>Megaptera novaeangliae</i>	Gulf of Maine	-/-; Y	1,393 (0; 1,380; 2016)	22	12.15
Minke whale	<i>Balaenoptera acutorostrata</i>	Canadian East Coast	-/-; N	21,968 (0.31; 17,002; 2016)	170	10.6
Sei whale	<i>Balaenoptera borealis</i>	Nova Scotia	E/D; Y	6,292 (1.02; 3,098; 2016)	6.2	0.8
Fin whale	<i>Balaenoptera physalus</i>	WNA	E/D; Y	6,802 (0.24; 5,573; 2016)	11	1.8
Odontoceti (toothed whales, dolphins, and porpoises)						
Family Ziphiidae (beaked whales)						
Cuvier's beaked whale	<i>Ziphius cavirostris</i>	WNA	-; N	5,744 (0.36; 4,282; 2016)	43	0.2
Mesoplodont beaked whales ⁵	<i>Mesoplodon</i> spp.	WNA	-; N	10,107 (0.27; 8,085; 2016)	81	0.4
Family Physeteridae						
Sperm whale	<i>Physeter macrocephalus</i>	North Atlantic	E/D; Y	4,349 (0.28; 3,451; 2016)	3.9	0
Family Delphinidae						
Rough-toothed dolphin	<i>Steno bredanensis</i>	WNA	-; N	136 (1.0; 67; 2016)	0.7	0
Bottlenose dolphin	<i>Tursiops truncatus</i>	WNA Offshore	-/-; N	62,851 (0.23; 51,914; 2016)	519	28
		WNA Northern Migratory Coastal	-/D;Y	6,639 (0.41, 4,759, 2016)	48	12.2-21.5
Atlantic spotted dolphin	<i>Stenella frontalis</i>	WNA	-/-; N	39,921 (0.27; 32,032; 2016)	320	0
Common dolphin	<i>Delphinus delphis</i>	WNA	-/-; N	172,974 (0.21; 145,216; 2016)	1,452	390
Atlantic white-sided dolphin	<i>Lagenorhynchus acutus</i>	WNA	-/-; N	93,233 (0.71; 54,443; 2016)	544	27
Risso's dolphin	<i>Grampus griseus</i>	WNA	-/-; N	35,215 (0.19; 30,051; 2016)	301	34
Short finned pilot whale	<i>Globicephala macrorhynchus</i>	WNA	-/-; N	28,924 (0.24; 23,637; 2016)	236	136

Long-finned pilot whale	<i>G. melas</i>	WNA	-/-; N	39,215 (0.30; 30,627; 2016)	306	9
Family Phocoenidae (porpoises)						
Harbor porpoise	<i>Phocoena phocoena</i>	Gulf of Maine/Bay of Fundy	-/-; N	95,543 (0.31; 74,034; 2016)	851	164
Order Carnivora – Pinnipedia						
Family Phocidae (earless seals)						
Gray seal ⁴	<i>Halichoerus grypus</i>	WNA	-/-; N	27,300 (0.22; 22,785; 2016)	1,458	4,452
Harbor seal	<i>Phoca vitulina</i>	WNA	-/-; N	61,336 (0.08; 57,637; 2018)	1,729	339

¹ESA status: Endangered (E), Threatened (T) / MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.

²NMFS marine mammal stock assessment reports online at: www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments. CV is coefficient of variation; Nmin is the minimum estimate of stock abundance. In some cases, CV is not applicable.

³These mortality and serious injury (M/SI) values, found in NMFS' SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (e.g., commercial fisheries, ship strike).

⁴NMFS' stock abundance estimate (and associated PBR value) applies to U.S. population only. Total stock abundance (including animals in Canada) is approximately 451,600. The annual M/SI value given is for the total stock.

⁵Mesoplodont beaked whales in the U.S. Atlantic include the Gervais beaked whale (*M. europaeus*), Blainville's beaked whale (*M. densirostris*), Sowerby's beaked whale (*M. bidens*), and True's beaked whale (*M. mirus*). These species are difficult to identify to the species level at sea; therefore, much of the available characterization for beaked whales is to genus level only and the species are managed together as a stock.

A detailed description of the species likely to be affected by TerraSond's activities, including information regarding population trends, threats, and local occurrence, was provided in the **Federal Register** notice for the proposed IHA (87 FR 66658; November 4, 2022); since that time, we are not aware of any changes in the status of these species and stocks; therefore, detailed descriptions are not provided here. Please refer to that **Federal Register** notice for these descriptions. Please also refer to NMFS' website (<https://www.fisheries.noaa.gov/find-species>) for generalized species accounts.

Marine Mammal Hearing

Hearing is the most important sensory modality for marine mammals underwater, and exposure to anthropogenic sound can have deleterious effects. To appropriately assess the potential effects of exposure to sound, it is necessary to understand the frequency ranges marine mammals are able to hear. Not all marine mammal species have equal hearing capabilities (*e.g.*, Richardson *et al.*, 1995; Wartzok and Ketten, 1999; Au and Hastings, 2008). To reflect this, Southall *et al.* (2007, 2019) recommended that marine mammals be divided into hearing groups based on directly measured (behavioral or auditory evoked potential techniques) or estimated hearing ranges (behavioral response data, anatomical modeling, *etc.*). Note that no direct measurements of hearing ability have been successfully completed for mysticetes (*i.e.*, low-frequency cetaceans). Subsequently, NMFS (2018) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the approximately 65 dB threshold from the normalized composite audiograms, with the exception for lower limits for low-frequency cetaceans where the lower bound was deemed to be biologically implausible and the lower bound from Southall *et al.* (2007) retained. Marine mammal hearing groups and their associated hearing ranges are provided in Table 3.

Table 3 -- Marine Mammal Hearing Groups (NMFS, 2018)

Hearing Group	Generalized Hearing Range*
Low-frequency (LF) cetaceans (baleen whales)	7 Hz to 35 kHz
Mid-frequency (MF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz
High-frequency (HF) cetaceans (true porpoises, <i>Kogia</i> , river dolphins, Cephalorhynchid, <i>Lagenorhynchus cruciger</i> & <i>L. australis</i>)	275 Hz to 160 kHz
Phocid pinnipeds (PW) (underwater) (true seals)	50 Hz to 86 kHz
Otariid pinnipeds (OW) (underwater) (sea lions and fur seals)	60 Hz to 39 kHz
* Represents the generalized hearing range for the entire group as a composite (<i>i.e.</i> , all species within the group), where individual species' hearing ranges are typically not as broad. Generalized hearing range chosen based on ~65 dB threshold from normalized composite audiogram, with the exception for lower limits for LF cetaceans (Southall <i>et al.</i> 2007) and PW pinniped (approximation).	

The pinniped functional hearing group was modified from Southall *et al.* (2007) on the basis of data indicating that phocid species have consistently demonstrated an extended frequency range of hearing compared to otariids, especially in the higher frequency range (Hemilä *et al.*, 2006; Kastelein *et al.*, 2009; Reichmuth and Holt, 2013).

For more detail concerning these groups and associated frequency ranges, please see NMFS (2018) for a review of available information.

Potential Effects of Specified Activities on Marine Mammals and Their Habitat

The effects of underwater noise from the deployed acoustic sources have the potential to result in behavioral harassment of marine mammals in the vicinity of the study area. The **Federal Register** notice for the proposed IHA (87 FR 66658; November 4, 2022) included a discussion of the effects of anthropogenic noise on marine mammals and their habitat, therefore that information is not repeated here; please refer to the **Federal Register** notice for that information.

Estimated Take

This section provides an estimate of the number of incidental takes authorized through the IHA, which will inform both NMFS' consideration of "small numbers," and the negligible impact determinations.

Harassment is the only type of take expected to result from these activities. Except with respect to certain activities not pertinent here, section 3(18) of the MMPA defines "harassment" as any act of pursuit, torment, or annoyance, which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

Authorized takes are by Level B harassment only, in the form of disruption of behavioral patterns for individual marine mammals resulting from exposure to sound produced by the sparker. Based primarily on the characteristics of the signals produced by the acoustic sources planned for use, Level A harassment is neither anticipated (even absent mitigation), nor authorized. Consideration of the anticipated effectiveness of the mitigation measures (*i.e.*, shutdown zones and shutdown measures), discussed in detail below in the **Mitigation** section, further strengthens the conclusion that Level A harassment is not a reasonably anticipated outcome of the survey activity. As described previously, no serious injury or mortality is anticipated or authorized for this activity. Below we describe how the take numbers are estimated.

For acoustic impacts, generally speaking, we estimate take by considering: (1) acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; (2) the area or volume of water that will be ensonified above these levels in a day; (3) the density or occurrence of marine mammals within these ensonified areas; and, (4) the number of days of activities. We note that while these factors can

contribute to a basic calculation to provide an initial prediction of potential takes, additional information that can qualitatively inform take estimates is also sometimes available (*e.g.*, previous monitoring results or average group size). Below, we describe the factors considered here in more detail and present the take estimates.

Acoustic Thresholds

NMFS recommends the use of acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to incur PTS of some degree (equated to Level A harassment).

Level B Harassment – Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source or exposure context (*e.g.*, frequency, predictability, duty cycle, duration of the exposure, signal-to-noise ratio, distance to the source), the environment (*e.g.*, bathymetry, other noises in the area, predators in the area), and the receiving animals (hearing, motivation, experience, demography, life stage, depth) and can be difficult to predict (*e.g.*, Southall *et al.*, 2007, 2021, Ellison *et al.*, 2012). Based on what the available science indicates and the practical need to use a threshold based on a metric that is both predictable and measurable for most activities, NMFS typically uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS generally predicts that marine mammals are likely to be behaviorally harassed in a manner considered to be Level B harassment when exposed to underwater anthropogenic noise above root-mean-squared pressure received levels (RMS SPL) of 160 dB (re 1 μ Pa) for impulsive (*e.g.*, seismic airguns) or intermittent (*e.g.*, scientific sonar) sources. Generally speaking, Level B harassment take estimates based on these behavioral harassment thresholds are expected to include any likely takes by temporary threshold shift (TTS) as, in most cases, the likelihood of TTS

occurs at distances from the source less than those at which behavioral harassment is likely. TTS of a sufficient degree can manifest as behavioral harassment, as reduced hearing sensitivity and the potential reduced opportunities to detect important signals (conspecific communication, predators, prey) may result in changes in behavior patterns that would not otherwise occur.

TerraSond's planned activity includes the use of impulsive (sparker) sources, and therefore the RMS SPL threshold of 160 dB re 1 μ Pa is applicable.

Level A harassment – NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0) (Technical Guidance, 2018) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). The references, analysis, and methodology used in the development of the thresholds are described in NMFS' 2018 Technical Guidance, which may be accessed at:

www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance.

TerraSond's planned activity includes the use of impulsive (*i.e.*, sparkers) sources. However, as discussed above, NMFS has concluded that Level A harassment is not a reasonably likely outcome for marine mammals exposed to noise through use of the sources planned for use here, and the potential for Level A harassment is not evaluated further in this document. Please see TerraSond's application for details of a quantitative exposure analysis exercise, *i.e.*, calculated Level A harassment isopleths and estimated Level A harassment exposures. TerraSond did not request authorization of take by Level A harassment, and no take by Level A harassment is authorized by NMFS.

Ensonified Area

Here, we describe operational and environmental parameters of the activity that are used in estimating the area ensonified above the acoustic thresholds, including source levels and transmission loss coefficient.

NMFS has developed a user-friendly methodology for estimating the extent of the Level B harassment isopleths associated with relevant HRG survey equipment (NMFS, 2020). This methodology incorporates frequency and directionality (when relevant) to refine estimated ensonified zones. For acoustic sources that operate with different beamwidths, the maximum beamwidth is used, and the lowest frequency of the source is used when calculating the frequency-dependent absorption coefficient (Table 1). The sparkers planned for use by TerraSond are omnidirectional and, therefore, beamwidth does not factor into the calculations.

NMFS considers the data provided by Crocker and Fratantonio (2016) to represent the best available information on source levels associated with HRG equipment and, therefore, recommends that source levels provided by Crocker and Fratantonio (2016) be incorporated in the method described above to estimate isopleth distances to harassment thresholds. In cases when the source level for a specific type of HRG equipment is not provided in Crocker and Fratantonio (2016), NMFS recommends that either the source levels provided by the manufacturer be used, or, in instances where source levels provided by the manufacturer are unavailable or unreliable, a proxy from Crocker and Fratantonio (2016) be used instead. Table 1 provides relevant source parameters used in the calculations. Results of modeling using the methodology described above produced an estimated Level B harassment isopleth of 141 m.

Central Atlantic – Phase 1, Alternative 1 would involve a single towed source, and daily ensonified area was calculated as follows: $(100 \text{ km} \times 2 \times 0.141 \text{ km}) + (\pi \times (0.141^2 \text{ km}))$. Distributing the 58,607 km of Phase 1, Alternative 1 survey activity across the 12-month period of anticipated activity results in approximately 48.8 survey days per

month, which was multiplied by the daily ensonified area to give a monthly ensonified area of 1,380 km. Phase 1, Alternative 2 would involve three towed sources with 150 m horizontal separation between them. Daily ensonified area was calculated as follows: $(100 \text{ km} \times 2 \times (0.141 \text{ km} + 0.15 \text{ km}) + (\pi \times (0.291^2 \text{ km})))$. Distributing the 19,536 km of Phase 1, Alternative 2 survey activity across the 12-month period of anticipated activity results in approximately 16.3 survey days per month, which was multiplied by the daily ensonified area to give a monthly ensonified area of 952 km². Because only one of the alternatives would ultimately be selected, the monthly ensonified area associated with Alternative 1 was used to estimate potential marine mammal take for Phase 1.

Phase 2 involves two towed sources with 30 m horizontal separation between them. Daily ensonified area was calculated as follows: $(100 \text{ km} \times 2 \times (0.141 \text{ km} + 0.015 \text{ km}) + (\pi \times (0.156^2 \text{ km})))$. Distributing the 46,573 km of Phase 2 survey activity across the 12-month period of anticipated activity results in approximately 38.8 survey days per month, which was multiplied by the daily ensonified area to give a monthly ensonified area of 1,214 km².

New York Bight – Phase 1 involves a single towed source, and ensonified area was calculated in the same manner as described above for Central Atlantic Phase 1, Alternative 1. Distributing the 14,833 km of Phase 1 survey activity across the 12-month period of anticipated activity results in approximately 12.4 survey days per month, which was multiplied by the daily ensonified area to give a monthly ensonified area of 349 km². Phases 2 and 3 each use a dual source configuration with a horizontal separation distance of 30 m between the sources, and ensonified area was calculated in the same manner as described above for Central Atlantic Phase 2. For Phase 2, TerraSond assumes that there would be two days of survey activity, giving a total ensonified area of 62.6 km². Distributing the combined 23,311 km of Phase 3 survey activity across the 12-month

period of anticipated activity results in approximately 19.4 survey days per month, which was multiplied by the daily ensonified area to give a monthly ensonified area of 608 km².

Marine Mammal Occurrence

In this section we provide information about the occurrence of marine mammals, including density or other relevant information, that will inform the take calculations.

Habitat-based density models produced by the Duke University Marine Geospatial Ecology Laboratory (Roberts and Halpin, 2022) represent the best available information regarding marine mammal densities in the survey area. These density data incorporate aerial and shipboard line-transect survey data from NMFS and other organizations and incorporate data from numerous physiographic and dynamic oceanographic and biological covariates, and control for the influence of sea state, group size, availability bias, and perception bias on the probability of making a sighting. These density models were originally developed for all cetacean taxa in the U.S. Atlantic (Roberts *et al.*, 2016). In subsequent years, the models have been updated based on additional data as well as certain methodological improvements. More information is available online at <https://seamap.env.duke.edu/models/Duke/EC/>. Marine mammal density estimates in the survey area (animals/km²) were obtained using the most recent model results for all taxa.

In order to select a representative sample of grid cells in and near each survey area, TerraSond created a 10-km wide perimeter around each area (Figures 1 and 2) in a Geographic Information System (GIS). The perimeter was then used to select grid cells in and around each area containing the monthly or annual estimates for each species. The average monthly abundance for each species in each area was calculated as the mean value of the selected grid cells in each month. See Tables 10 and 11 in TerraSond's application for density values used in the analysis.

Density information is presented for seals generically. In order to generate species-specific density values, TerraSond multiplied seal density values by the proportion of total SAR-estimated seal abundance attributed to each species. Roberts and Halpin (2022) similarly provide generic density information for pilot whales and bottlenose dolphins. In the Central Atlantic survey area, where both species of pilot whales could be encountered, TerraSond requested that the density-based take estimate be divided equally across the two species. In the New York Bight survey area, only the long-finned pilot whale is expected to be present, and all estimated takes are attributed to that species. For bottlenose dolphins, although the northern coastal migratory stock could be present in the region, all survey effort is in sufficiently deep water (20-65 m) that we assume all potential bottlenose dolphin takes are appropriately assigned to the offshore stock.

Take Estimation

Here we describe how the information provided above is synthesized to produce a quantitative estimate of the take that is reasonably likely to occur and is authorized.

Estimates of the potential number of takes by Level B harassment were calculated by multiplying the monthly density for each species in the respective survey areas (Central Atlantic and New York Bight) by the respective monthly ensonified area for each Phase and then summing across the 12 months. TerraSond evaluated monitoring reports from the vicinity of the survey areas, finding that the common dolphin estimated take number for the New York Bight survey area may be underestimated. Based on these observational data, TerraSond assumes that 16 common dolphins may be encountered within the harassment zone on each survey data. Based on the planned 385 survey days in the New York Bight survey area, this produces an estimate of 6,160 takes. This larger value is substituted for the density-based take estimate for common dolphins. Table 4 provides information about the take estimates and authorized take.

Table 4 -- Estimated Take Numbers and Total Authorized Take

Species	Estimated Take – Central Atlantic		Estimated Take – New York Bight			Authorized take	Percent abundance
	Phase 1	Phase 2	Phase 1	Phase 2	Phase 3		
North Atlantic right whale	5.1	4.5	1.9	0.0	3.3	15	4.4
Humpback whale	21.6	19.0	4.0	0.1	7.0	52	3.7
Minke whale	30.7	27.0	14.7	0.2	25.5	98	0.4
Sei whale	4.9	4.3	1.2	0.0	2.2	13	0.2
Fin whale	44.1	38.8	8.0	0.1	14.0	105	1.5
Cuvier's beaked whale	29.1	25.6	0	0	0	55	1.0
Mesoplodont beaked whales	5.7	5.0	0	0	0	11	0.1
Sperm whale	16.0	14.1	0.6	0	1.1	32	0.7
Rough-toothed dolphin ¹	2.0	1.6	0	0	0	10	7.4
Bottlenose dolphin	1,427.7	1,255.6	116.6	1.8	202.8	3,005	4.8
Atlantic spotted dolphin	605.6	532.6	20.9	0.3	36.3	1,196	3.0
Common dolphin ²	5,097.1	4,482.4	597.5	8.9	1,039.1	11,225	6.5
Atlantic white-sided dolphin	117.6	103.4	45.1	0.7	78.4	345	0.4
Risso's dolphin	171.9	151.2	5.7	0.1	9.9	339	1.0
Short-finned pilot whale	238.8	210.1	0	0	0	449	1.6
Long-finned pilot whale	238.9	210.0	11.1	0.2	19.3	480	1.2
Harbor porpoise	124.0	109.1	102.1	1.5	177.6	514	0.5
Gray seal	439.7	386.7	60.6	0.9	105.4	993	0.2
Harbor seal	237.5	208.9	136.2	2.0	236.9	822	1.3

¹ For rough-toothed dolphin, we authorize take in the form of one encounter with a group of average size, as assumed average group size (10) is larger than the total estimated take number (4). Mean group sizes were calculated from regional sightings data (Whitt *et al.*, 2015; Kraus *et al.*, 2016; Palka *et al.*, 2017).

² For common dolphin, estimated take numbers for the New York Bight survey area were calculated based on an assumption (based on monitoring data from the area) that 16 dolphins per day could be encountered within the harassment zone. These values were larger than and used instead of the results of density-based calculations.

Mitigation

In order to issue an IHA under section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to the activity, and other means of effecting the least practicable impact on the species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stock for taking for certain subsistence uses (latter not applicable for this action). NMFS regulations require applicants for incidental take

authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting the activity or other means of effecting the least practicable adverse impact upon the affected species or stocks, and their habitat (50 CFR 216.104(a)(11)).

In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, NMFS considers two primary factors:

(1) The manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat, as well as subsistence uses. This considers the nature of the potential adverse impact being mitigated (likelihood, scope, range). It further considers the likelihood that the measure will be effective if implemented (probability of accomplishing the mitigating result if implemented as planned), the likelihood of effective implementation (probability implemented as planned); and

(2) The practicability of the measures for applicant implementation, which may consider such things as cost, and impact on operations.

NMFS requires that the following mitigation measures be implemented during TerraSond's planned marine site characterization surveys. Pursuant to section 7 of the ESA, TerraSond is also required to adhere to relevant Project Design Criteria (PDC) of the NMFS' Greater Atlantic Regional Fisheries Office (GARFO) programmatic consultation (specifically PDCs 4, 5, and 7) regarding geophysical surveys along the U.S. Atlantic coast (www.fisheries.noaa.gov/new-england-mid-atlantic/consultations/section-7-take-reporting-programmatics-greater-atlantic#offshore-wind-site-assessment-and-site-characterization-activities-programmatic-consultation).

Visual Monitoring and Shutdown Zones

During survey operations (*e.g.*, any day on which use of the sparker source is planned to occur, and whenever the sparker source is in the water, whether activated or not), a minimum of one visual PSO must be on duty on each source vessel and conducting visual observations at all times during daylight hours (*i.e.*, from 30 minutes prior to sunrise through 30 minutes following sunset). A minimum of two PSOs must be on duty on each source vessel during nighttime hours. Visual monitoring must begin no less than 30 minutes prior to ramp-up (described below) and must continue until one hour after use of the sparker source ceases.

Visual PSOs shall coordinate to ensure 360° visual coverage around the vessel from the most appropriate observation posts and shall conduct visual observations using binoculars and the naked eye while free from distractions and in a consistent, systematic, and diligent manner. PSOs shall establish and monitor applicable shutdown zones (see below). These zones shall be based upon the radial distance from the sparker source (rather than being based around the vessel itself).

Two shutdown zones are defined, depending on the species and context. Here, an extended shutdown zone encompassing the area at and below the sea surface out to a radius of 500 m from the sparker source (0–500 m) is defined for NARWs. For all other marine mammals, the shutdown zone encompasses a standard distance of 100 m (0-100 m). Any observations of marine mammals by crew members aboard any vessel associated with the survey shall be relayed to the PSO team.

Visual PSOs may be on watch for a maximum of four consecutive hours followed by a break of at least one hour between watches and may conduct a maximum of 12 hours of observation per 24-hr period.

Pre-Start Clearance and Ramp-up

A ramp-up procedure, involving a gradual increase in source level output, is required at all times as part of the activation of the sparker source when technically

feasible. Operators should ramp up sparkers to half power for 5 minutes and then proceed to full power. A 30-minute pre-start clearance observation period must occur prior to the start of ramp-up. The intent of pre-start clearance observation (30 minutes) is to ensure no marine mammals are within the shutdown zones prior to the beginning of ramp-up. The intent of ramp-up is to warn marine mammals of pending operations and to allow sufficient time for those animals to leave the immediate vicinity. All operators must adhere to the following pre-start clearance and ramp-up requirements:

- The operator must notify a designated PSO of the planned start of ramp-up as agreed upon with the lead PSO; the notification time should not be less than 60 minutes prior to the planned ramp-up in order to allow the PSOs time to monitor the shutdown zones for 30 minutes prior to the initiation of ramp-up (pre-start clearance). During this 30 minute pre-start clearance period the entire shutdown zone must be visible, except as indicated below.
- Ramp-ups shall be scheduled so as to minimize the time spent with the source activated.
- A visual PSO conducting pre-start clearance observations must be notified again immediately prior to initiating ramp-up procedures and the operator must receive confirmation from the PSO to proceed.
- Any PSO on duty has the authority to delay the start of survey operations if a marine mammal is detected within the applicable pre-start clearance zone.
- The operator must establish and maintain clear lines of communication directly between PSOs on duty and crew controlling the acoustic source to ensure that mitigation commands are conveyed swiftly while allowing PSOs to maintain watch.
- The pre-start clearance requirement is waived for small delphinids and pinnipeds. Detection of a small delphinid (individual belonging to the following genera of the Family Delphinidae: *Steno*, *Delphinus*, *Lagenorhynchus*, *Stenella*, and *Tursiops*) or

pinniped within the shutdown zone does not preclude beginning of ramp-up, unless the PSO confirms the individual to be of a genus other than those listed, in which case normal pre-clearance requirements apply.

- If there is uncertainty regarding identification of a marine mammal species (*i.e.*, whether the observed marine mammal(s) belongs to one of the delphinid genera for which the pre-clearance requirement is waived), PSOs may use best professional judgment in making the decision to call for a shutdown.

- Ramp-up may not be initiated if any marine mammal to which the pre-start clearance requirement applies is within the shutdown zone. If a marine mammal is observed within the shutdown zone during the 30 minute pre-start clearance period, ramp-up may not begin until the animal(s) has been observed exiting the zones or until an additional time period has elapsed with no further sightings (30 minutes for all baleen whale species and sperm whales and 15 minutes for all other species).

- PSOs must monitor the shutdown zones 30 minutes before and during ramp-up, and ramp-up must cease and the source must be shut down upon observation of a marine mammal within the applicable shutdown zone.

- Ramp-up may occur at times of poor visibility, including nighttime, if appropriate visual monitoring has occurred with no detections of marine mammals in the 30 minutes prior to beginning ramp-up. Sparker activation may only occur at night where operational planning cannot reasonably avoid such circumstances.

- If the acoustic source is shut down for brief periods (*i.e.*, less than 30 minutes) for reasons other than implementation of prescribed mitigation (*e.g.*, mechanical difficulty), it may be activated again without ramp-up if PSOs have maintained constant visual observation and no detections of marine mammals have occurred within the applicable shutdown zone. For any longer shutdown, pre-start clearance observation and ramp-up are required.

Shutdown

All operators must adhere to the following shutdown requirements:

- Any PSO on duty has the authority to call for shutdown of the sparker source if a marine mammal is detected within the applicable shutdown zone.
- The operator must establish and maintain clear lines of communication directly between PSOs on duty and crew controlling the source to ensure that shutdown commands are conveyed swiftly while allowing PSOs to maintain watch.
- When the sparker source is active and a marine mammal appears within or enters the applicable shutdown zone, the source must be shut down. When shutdown is instructed by a PSO, the source must be immediately deactivated and any dispute resolved only following deactivation.
- The shutdown requirement is waived for small delphinids and pinnipeds. If a small delphinid (individual belonging to the following genera of the Family Delphinidae: *Steno*, *Delphinus*, *Lagenorhynchus*, *Stenella*, and *Tursiops*) or pinniped is visually detected within the shutdown zone, no shutdown is required unless the PSO confirms the individual to be of a genus other than those listed, in which case a shutdown is required.
- If there is uncertainty regarding identification of a marine mammal species (*i.e.*, whether the observed marine mammal(s) belongs to one of the delphinid genera for which shutdown is waived or one of the species with a larger shutdown zone), PSOs may use best professional judgment in making the decision to call for a shutdown.
- Upon implementation of shutdown, the source may be reactivated after the marine mammal has been observed exiting the applicable shutdown zone or following a clearance period (30 minutes for all baleen whale species and sperm whales and 15 minutes for all other species) with no further detection of the marine mammal.

If a species for which authorization has not been granted, or a species for which authorization has been granted but the authorized number of takes have been met, approaches or is observed within the Level B harassment zone, shutdown would occur.

Vessel Strike Avoidance

Crew and supply vessel personnel should use an appropriate reference guide that includes identifying information on all marine mammals that may be encountered. Vessel operators must comply with the below measures except under extraordinary circumstances when the safety of the vessel or crew is in doubt or the safety of life at sea is in question. These requirements do not apply in any case where compliance would create an imminent and serious threat to a person or vessel or to the extent that a vessel is restricted in its ability to maneuver and, because of the restriction, cannot comply.

- Vessel operators and crews must maintain a vigilant watch for all marine mammals and slow down, stop their vessel, or alter course, as appropriate and regardless of vessel size, to avoid striking any marine mammal. A single marine mammal at the surface may indicate the presence of submerged animals in the vicinity of the vessel; therefore, precautionary measures should always be exercised. A visual observer aboard the vessel must monitor a vessel strike avoidance zone around the vessel (species-specific distances detailed below). Visual observers monitoring the vessel strike avoidance zone may be third-party observers (*i.e.*, PSOs) or crew members, but crew members responsible for these duties must be provided sufficient training to: (1) distinguish marine mammal from other phenomena and (2) broadly to identify a marine mammal as a right whale, other whale (defined in this context as sperm whales or baleen whales other than right whales), or other marine mammals.

- All vessels, regardless of size, must observe a 10-kn speed restriction in specific areas designated by NMFS for the protection of North Atlantic right whales from vessel strikes. These include all Seasonal Management Areas (SMA) (when in effect),

any dynamic management areas (DMA) (when in effect), and Slow Zones. See www.fisheries.noaa.gov/national/endangered-species-conservation/reducing-ship-strikes-north-atlantic-right-whales for specific detail regarding these areas.

- Vessel speeds must also be reduced to 10 kn or less when mother/calf pairs, pods, or large assemblages of cetaceans are observed near a vessel.
- All vessels must maintain a minimum separation distance of 500 m from right whales. If a right whale is sighted within the relevant separation distance, the vessel must steer a course away at 10 kn or less until the 500-m separation distance has been established. If a whale is observed but cannot be confirmed as a species other than a right whale, the vessel operator must assume that it is a right whale and take appropriate action.
- All vessels must maintain a minimum separation distance of 100 m from sperm whales and all other baleen whales.
- All vessels must, to the maximum extent practicable, attempt to maintain a minimum separation distance of 50 m from all other marine mammals, with an understanding that at times this may not be possible (*e.g.*, for animals that approach the vessel).
- When marine mammals are sighted while a vessel is underway, the vessel shall take action as necessary to avoid violating the relevant separation distance (*e.g.*, attempt to remain parallel to the animal's course, avoid excessive speed or abrupt changes in direction until the animal has left the area, reduce speed and shift the engine to neutral). This does not apply to any vessel towing gear or any vessel that is navigationally constrained.

Members of the PSO team will consult NMFS' North Atlantic right whale reporting system and Whale Alert, daily and as able, for the presence of NARWs throughout survey operations, and for the establishment of DMAs and/or Slow Zones. It

is TerraSond's responsibility to maintain awareness of the establishment and location of any such areas and to abide by these requirements accordingly.

Based on our evaluation of the required measures, as well as other measures considered by NMFS, NMFS has determined that the mitigation measures provide the means of effecting the least practicable impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Monitoring and Reporting

In order to issue an IHA for an activity, section 101(a)(5)(D) of the MMPA states that NMFS must set forth requirements pertaining to the monitoring and reporting of such taking. The MMPA implementing regulations at 50 CFR 216.104(a)(13) indicate that requests for authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present while conducting the activities. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.

Monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:

- Occurrence of marine mammal species or stocks in the area in which take is anticipated (*e.g.*, presence, abundance, distribution, density);
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) action or environment (*e.g.*, source characterization, propagation, ambient noise); (2) affected species (*e.g.*, life history, dive patterns); (3) co-occurrence of

marine mammal species with the activity; or (4) biological or behavioral context of exposure (*e.g.*, age, calving or feeding areas);

- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors;
- How anticipated responses to stressors impact either: (1) long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks;
- Effects on marine mammal habitat (*e.g.*, marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat); and,
- Mitigation and monitoring effectiveness.

TerraSond must use independent, dedicated, trained PSOs, meaning that the PSOs must be employed by a third-party observer provider, must have no tasks other than to conduct observational effort, collect data, and communicate with and instruct relevant vessel crew with regard to the presence of marine mammal and mitigation requirements (including brief alerts regarding maritime hazards), and must have successfully completed an approved PSO training course for geophysical surveys. Visual monitoring must be performed by qualified, NMFS-approved PSOs. PSO resumes must be provided to NMFS for review and approval prior to the start of survey activities.

PSO names must be provided to NMFS by the operator for review and confirmation of their approval for specific roles prior to commencement of the survey. For prospective PSOs not previously approved, or for PSOs whose approval is not current, NMFS must review and approve PSO qualifications. Resumes should include information related to relevant education, experience, and training, including dates, duration, location, and description of prior PSO experience. Resumes must be accompanied by relevant documentation of successful completion of necessary training.

NMFS may approve PSOs as conditional or unconditional. A conditionally-approved PSO may be one who is trained but has not yet attained the requisite experience. An unconditionally-approved PSO is one who has attained the necessary experience. For unconditional approval, the PSO must have a minimum of 90 days at sea performing the role during a geophysical survey, with the conclusion of the most recent relevant experience not more than 18 months previous.

At least one of the visual PSOs aboard the vessel must be unconditionally-approved. One unconditionally-approved visual PSO shall be designated as the lead for the entire PSO team. This lead should typically be the PSO with the most experience, who would coordinate duty schedules and roles for the PSO team and serve as primary point of contact for the vessel operator. To the maximum extent practicable, the duty schedule shall be planned such that unconditionally-approved PSOs are on duty with conditionally-approved PSOs.

PSOs must successfully complete relevant training, including completion of all required coursework and passing (80 percent or greater) a written and/or oral examination developed for the training program.

PSOs must have successfully attained a bachelor's degree from an accredited college or university with a major in one of the natural sciences, a minimum of 30 semester hours or equivalent in the biological sciences, and at least one undergraduate course in math or statistics. The educational requirements may be waived if the PSO has acquired the relevant skills through alternate experience. Requests for such a waiver shall be submitted to NMFS and must include written justification. Alternate experience that may be considered includes, but is not limited to (1) secondary education and/or experience comparable to PSO duties; (2) previous work experience conducting academic, commercial, or government-sponsored marine mammal surveys; and (3)

previous work experience as a PSO (PSO must be in good standing and demonstrate good performance of PSO duties).

TerraSond must work with the selected third-party PSO provider to ensure PSOs have all equipment (including backup equipment) needed to adequately perform necessary tasks, including accurate determination of distance and bearing to observed marine mammals, and to ensure that PSOs are capable of calibrating equipment as necessary for accurate distance estimates and species identification. Such equipment, at a minimum, shall include:

- At least one thermal (infrared) image device suited for the marine environment;
- Reticle binoculars (*e.g.*, 7 x 50) of appropriate quality (at least one per PSO, plus backups);
- Global Positioning Units (GPS) (at least one plus backups);
- Digital cameras with a telephoto lens that is at least 300-mm or equivalent on a full-frame single lens reflex (SLR) (at least one plus backups). The camera or lens should also have an image stabilization system;
- Equipment necessary for accurate measurement of distances to marine mammal;
- Compasses (at least one plus backups);
- Means of communication among vessel crew and PSOs; and
- Any other tools deemed necessary to adequately and effectively perform PSO tasks.

The equipment specified above may be provided by an individual PSO, the third-party PSO provider, or the operator, but TerraSond is responsible for ensuring PSOs have the proper equipment required to perform the duties specified in the IHA.

The PSOs will be responsible for monitoring the waters surrounding the survey vessel to the farthest extent permitted by sighting conditions, including shutdown zones, during all HRG survey operations. PSOs will visually monitor and identify marine mammals, including those approaching or entering the established shutdown zones during survey activities. It will be the responsibility of the PSO(s) on duty to communicate the presence of marine mammals as well as to communicate the action(s) that are necessary to ensure mitigation and monitoring requirements are implemented as appropriate.

PSOs must be equipped with binoculars and have the ability to estimate distance and bearing to detect marine mammals, particularly in proximity to shutdown zones. Reticulated binoculars must also be available to PSOs for use as appropriate based on conditions and visibility to support the sighting and monitoring of marine mammals. During nighttime operations, night-vision goggles with thermal clip-ons and infrared technology must be available for use. Position data would be recorded using hand-held or vessel GPS units for each sighting.

During good conditions (*e.g.*, daylight hours; Beaufort sea state (BSS) 3 or less), to the maximum extent practicable, PSOs should also conduct observations when the acoustic source is not operating for comparison of sighting rates and behavior with and without use of the active acoustic sources. Any observations of marine mammals by crew members aboard the vessel associated with the survey would be relayed to the PSO team. Data on all PSO observations would be recorded based on standard PSO collection requirements (*see Reporting Measures*). This would include dates, times, and locations of survey operations; dates and times of observations, location and weather; details of marine mammal sightings (*e.g.*, species, numbers, behavior); and details of any observed marine mammal behavior that occurs (*e.g.*, noted behavioral disturbances).

Reporting Measures

TerraSond shall submit a draft summary report on all activities and monitoring results within 90 days of the completion of the survey or expiration of the IHA, whichever comes sooner. The report must describe all activities conducted and sightings of marine mammals, must provide full documentation of methods, results, and interpretation pertaining to all monitoring, and must summarize the dates and locations of survey operations and all marine mammals sightings (dates, times, locations, activities, associated survey activities). The draft report shall also include geo-referenced, time-stamped vessel tracklines for all time periods during which acoustic sources were operating. Tracklines should include points recording any change in acoustic source status (*e.g.*, when the sources began operating, when they were turned off, or when they changed operational status such as from full array to single gun or vice versa). GIS files shall be provided in ESRI shapefile format and include the UTC date and time, latitude in decimal degrees, and longitude in decimal degrees. All coordinates shall be referenced to the WGS84 geographic coordinate system. In addition to the report, all raw observational data shall be made available. The report must summarize the information. A final report must be submitted within 30 days following resolution of any comments on the draft report. All draft and final marine mammal monitoring reports must be submitted to *PR.ITP.MonitoringReports@noaa.gov* and *nmfs.gar.incidental-take@noaa.gov*.

PSOs must use standardized electronic data forms to record data. PSOs shall record detailed information about any implementation of mitigation requirements, including the distance of marine mammal to the acoustic source and description of specific actions that ensued, the behavior of the animal(s), any observed changes in behavior before and after implementation of mitigation, and if shutdown was implemented, the length of time before any subsequent ramp-up of the acoustic source. If required mitigation was not implemented, PSOs should record a description of the circumstances. At a minimum, the following information must be recorded:

1. Vessel name (source vessel), vessel size and type, maximum speed capability of vessel;
2. Dates of departures and returns to port with port name;
3. PSO names and affiliations;
4. Date and participants of PSO briefings;
5. Visual monitoring equipment used;
6. PSO location on vessel and height of observation location above water surface;
7. Dates and times (Greenwich Mean Time) of survey on/off effort and times corresponding with PSO on/off effort;
8. Vessel location (decimal degrees) when survey effort begins and ends and vessel location at beginning and end of visual PSO duty shifts;
9. Vessel location at 30-second intervals if obtainable from data collection software, otherwise at practical regular interval
10. Vessel heading and speed at beginning and end of visual PSO duty shifts and upon any change;
11. Water depth (if obtainable from data collection software);
12. Environmental conditions while on visual survey (at beginning and end of PSO shift and whenever conditions change significantly), including BSS and any other relevant weather conditions including cloud cover, fog, sun glare, and overall visibility to the horizon;
13. Factors that may contribute to impaired observations during each PSO shift change or as needed as environmental conditions change (*e.g.*, vessel traffic, equipment malfunctions); and
14. Survey activity information (and changes thereof), such as acoustic source power output while in operation, number and volume of airguns operating in an array,

tow depth of an acoustic source, and any other notes of significance (*i.e.*, pre-start clearance, ramp-up, shutdown, testing, shooting, ramp-up completion, end of operations, streamers, etc.).

15. Upon visual observation of any marine mammal, the following information must be recorded:

- a. Watch status (sighting made by PSO on/off effort, opportunistic, crew, alternate vessel/platform);
- b. Vessel/survey activity at time of sighting (*e.g.*, deploying, recovering, testing, shooting, data acquisition, other);
- c. PSO who sighted the animal;
- d. Time of sighting;
- e. Initial detection method;
- f. Sightings cue;
- g. Vessel location at time of sighting (decimal degrees);
- h. Direction of vessel's travel (compass direction);
- i. Speed of the vessel(s) from which the observation was made;
- j. Identification of the animal (*e.g.*, genus/species, lowest possible taxonomic level or unidentified); also note the composition of the group if there is a mix of species;
- k. Species reliability (an indicator of confidence in identification);
- l. Estimated distance to the animal and method of estimating distance;
- m. Estimated number of animals (high/low/best);
- n. Estimated number of animals by cohort (adults, yearlings, juveniles, calves, group composition, etc.);

- o. Description (as many distinguishing features as possible of each individual seen, including length, shape, color, pattern, scars, or markings, shape and size of dorsal fin, shape of head, and blow characteristics);
- p. Detailed behavior observations (*e.g.*, number of blows/breaths, number of surfaces, breaching, spyhopping, diving, feeding, traveling; as explicit and detailed as possible; note any observed changes in behavior before and after point of closest approach);
- q. Mitigation actions; description of any actions implemented in response to the sighting (*e.g.*, delays, shutdowns, ramp-up, speed or course alteration, etc.) and time and location of the action;
- r. Equipment operating during sighting;
- s. Animal's closest point of approach and/or closest distance from the center point of the acoustic source; and
- t. Description of any actions implemented in response to the sighting (*e.g.*, delays, shutdown, ramp-up) and time and location of the action.

If a NARW is observed at any time by PSOs or personnel on the project vessel, during surveys or during vessel transit, TerraSond must report the sighting information to the NMFS North Atlantic Right Whale Sighting Advisory System (866-755-6622) within 2 hours of occurrence, when practicable, or no later than 24 hours after occurrence. North Atlantic right whale sightings in any location may also be reported to the U.S. Coast Guard via channel 16 and through the WhaleAlert app (www.whalealert.org).

In the event that personnel involved in the survey activities discover an injured or dead marine mammal, the incident must be reported to NMFS as soon as feasible by phone (866-755-6622) and by email (nmfs.gar.incidental-take@noaa.gov and PR.ITP.MonitoringReports@noaa.gov). The report must include the following information:

1. Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);
2. Species identification (if known) or description of the animal(s) involved;
3. Condition of the animal(s) (including carcass condition if the animal is dead);
4. Observed behaviors of the animal(s), if alive;
5. If available, photographs or video footage of the animal(s); and
6. General circumstances under which the animal was discovered.

In the event of a ship strike of a marine mammal by any vessel involved in the activities, TerraSond must report the incident to NMFS by phone (866-755-6622) and by email (*nmfs.gar.incidental-take@noaa.gov* and *PR.ITP.MonitoringReports@noaa.gov*) as soon as feasible. The report must include the following information:

1. Time, date, and location (latitude/longitude) of the incident;
2. Species identification (if known) or description of the animal(s) involved;
3. Vessel's speed during and leading up to the incident;
4. Vessel's course/heading and what operations were being conducted (if applicable);
5. Status of all sound sources in use;
6. Description of avoidance measures/requirements that were in place at the time of the strike and what additional measures were taken, if any, to avoid strike;
7. Environmental conditions (*e.g.*, wind speed and direction, BSS, cloud cover, visibility) immediately preceding the strike;
8. Estimated size and length of animal that was struck;
9. Description of the behavior of the marine mammal immediately preceding and/or following the strike;

10. If available, description of the presence and behavior of any other marine mammals immediately preceding the strike;
11. Estimated fate of the animal (*e.g.*, dead, injured but alive, injured and moving, blood or tissue observed in the water, status unknown, disappeared); and
12. To the extent practicable, photographs or video footage of the animal(s).

Negligible Impact Analysis and Determination

NMFS has defined negligible impact as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.*, population-level effects). An estimate of the number of takes alone is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be “taken” through harassment, NMFS considers other factors, such as the likely nature of any impacts or responses (*e.g.*, intensity, duration), the context of any impacts or responses (*e.g.*, critical reproductive time or location, foraging impacts affecting energetics), as well as effects on habitat, and the likely effectiveness of the mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS’ implementing regulations (54 FR 40338, September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into this analysis via their impacts on the baseline (*e.g.*, as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels).

To avoid repetition, the majority of our analysis applies to all the species listed in Table 2, given that the anticipated effects of this project on different marine mammal

stocks are expected to be relatively similar in nature. Where there are meaningful differences between species or stocks, or groups of species, in anticipated individual responses to activities, impact of expected take on the population due to differences in population status, or impacts on habitat, they are included as a separate sub-sections. Specifically, we provide additional discussion related to NARWs and to other species currently experiencing unusual mortality events (UME).

NMFS does not anticipate that serious injury or mortality would occur as a result of HRG surveys, even in the absence of mitigation, and no serious injury or mortality is authorized. As discussed in the **Potential Effects of Specified Activities on Marine Mammals and their Habitat** section of the proposed **Federal Register** notice (87 FR 66658, November 4, 2022), non-auditory physical effects and vessel strike are not expected to occur. NMFS expects that all potential takes would be in the form of short-term Level B behavioral harassment, *e.g.*, temporary avoidance of the area or decreased foraging (if such activity was occurring), reactions that are considered to be of low severity and with no lasting biological consequences (*e.g.*, Southall *et al.*, 2007, Ellison *et al.*, 2012). As described above, Level A harassment is not expected to occur given the nature of the operations, the estimated size of the Level A harassment zones, and the required shutdown zones for certain activities.

In addition to being temporary, the maximum expected harassment zone around a survey vessel is 141 m. Therefore, the ensonified area surrounding each vessel is relatively small compared to the overall distribution of the animals in the area and their use of the habitat. Feeding behavior is not likely to be significantly impacted as prey species are mobile and are broadly distributed throughout the survey area; therefore, marine mammals that may be temporarily displaced during survey activities are expected to be able to resume foraging once they have moved away from areas with disturbing levels of underwater noise. Because of the temporary nature of the disturbance and the

availability of similar habitat and resources in the surrounding area, the impacts to marine mammals and the food sources that they utilize are not expected to cause significant or long-term consequences for individual marine mammals or their populations.

There are no rookeries, mating or calving grounds known to be biologically important to marine mammals within the survey area and there are no feeding areas known to be biologically important to marine mammals within the survey area. There is no designated critical habitat for any ESA-listed marine mammals in the survey area.

North Atlantic Right Whales

The status of the NARW population is of heightened concern and, therefore, merits additional analysis. As noted previously, elevated NARW mortalities began in 2017 and there is an active UME. Overall, preliminary findings support human interactions, specifically vessel strikes and entanglements, as the cause of death for the majority of right whales. The survey area overlaps a migratory corridor BIA for NARWs that extends from Massachusetts to Florida and from the coast to beyond the shelf break. Due to the fact that the survey activities are temporary and the spatial extent of sound produced by the survey would be small relative to the spatial extent of the available migratory habitat in the BIA, right whale migration is not expected to be impacted by the planned survey. Given the relatively small size of the ensonified area, it is unlikely that prey availability would be adversely affected by HRG survey operations. Required vessel strike avoidance measures will also decrease risk of ship strike during migration; no ship strike is expected to occur during TerraSond's activities. Additionally, only very limited take by Level B harassment of NARWs has been requested and is being authorized by NMFS as HRG survey operations are required to maintain and implement a 500 m shutdown zone. The 500 m shutdown zone for right whales is conservative, considering the Level B harassment isopleth for the acoustic source (*i.e.*, sparker) is estimated to be 141 m, and thereby minimizes the potential for behavioral harassment of this species. As

noted previously, Level A harassment is not expected due to the small estimated zones in conjunction with the aforementioned shutdown requirements. NMFS does not anticipate North Atlantic right whales takes that would result from TerraSond's activities would impact annual rates of recruitment or survival. Thus, any takes that occur would not result in population level impacts.

Other Marine Mammal Species With Active UMEs

As noted previously, there are several active UMEs occurring in the vicinity of TerraSond's survey areas. Elevated humpback whale mortalities have occurred along the Atlantic coast from Maine through Florida since 2016. Of the cases examined, approximately half had evidence of human interaction (ship strike or entanglement). The UME does not yet provide cause for concern regarding population-level impacts. Despite the UME, the relevant population of humpback whales (the West Indies breeding population, or DPS) remains stable at approximately 12,000 individuals.

Beginning in 2017, elevated minke whale strandings have occurred along the Atlantic coast from Maine through South Carolina, with highest numbers in Massachusetts, Maine, and New York. This event does not provide cause for concern regarding population level impacts, as the likely population abundance is greater than 20,000 whales.

Elevated numbers of harbor seal and gray seal mortalities were first observed between 2018-2020 and, as part of a separate UME, again in 2022. These have occurred across Maine, New Hampshire, and Massachusetts. Based on tests conducted so far, the main pathogen found in the seals is phocine distemper virus (2018-2020) and avian influenza (2022), although additional testing to identify other factors that may be involved in the UMEs is underway. The UMEs do not provide cause for concern regarding population-level impacts to any of these stocks. For harbor seals, the population abundance is over 60,000 and annual M/SI (339) is well below PBR (1,729)

(Hayes *et al.*, 2021). The population abundance for gray seals in the United States is over 27,000, with an estimated abundance, including seals in Canada, of approximately 450,000. In addition, the abundance of gray seals is likely increasing in the U.S. Atlantic as well as in Canada (Hayes *et al.*, 2021).

The required mitigation measures are expected to reduce the number and/or severity of takes for all species listed in Table 2, including those with active UMEs, to the level of least practicable adverse impact. In particular, they would provide animals the opportunity to move away from the sound source before HRG survey equipment reaches full energy, thus preventing them from being exposed to more severe Level B harassment. No Level A harassment is anticipated, even in the absence of mitigation measures, or authorized.

NMFS expects that takes would be in the form of short-term Level B behavioral harassment by way of brief startling reactions and/or temporary vacating of the area, or decreased foraging (if such activity was occurring)—reactions that (at the scale and intensity anticipated here) are considered to be of low severity, with no lasting biological consequences. Since both the sources and marine mammals are mobile, animals would only be exposed briefly to a small ensonified area that might result in take. Required mitigation measures, such as shutdown zones and ramp up, would further reduce exposure to sound that could result in more severe behavioral harassment.

In summary and as described above, the following factors primarily support our determination that the impacts resulting from this activity are not expected to adversely affect the species or stock through effects on annual rates of recruitment or survival:

- No mortality or serious injury is anticipated or authorized;
- No Level A harassment (PTS) is anticipated, even in the absence of mitigation measures, or authorized;

- Foraging success is not likely to be significantly impacted as effects on species that serve as prey species for marine mammals from the survey are expected to be minimal;
- The availability of alternate areas of similar habitat value for marine mammals to temporarily vacate the ensonified areas during the planned survey to avoid exposure to sounds from the activity;
- Take is anticipated to be primarily Level B behavioral harassment consisting of brief startling reactions and/or temporary avoidance of the ensonified area;
- While the survey area is within areas noted as a migratory BIA for NARWs, avoidance of the survey area due to the activities is not anticipated and would not likely affect migration. In addition, mitigation measures require shutdown at 500 m (almost four times the size of the Level B harassment isopleth of 141 m) to minimize the effects of any Level B harassment take of the species; and
- The required mitigation measures, including visual monitoring and shutdowns, are expected to minimize potential impacts to other marine mammals.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the required monitoring and mitigation measures, NMFS finds that the total marine mammal take from the activity will have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

As noted previously, only small numbers of incidental take may be authorized under sections 101(a)(5)(A) and (D) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers and so, in practice, where estimated numbers are available, NMFS compares the number of individuals taken to the most appropriate estimation of abundance of the relevant species

or stock in our determination of whether an authorization is limited to small numbers of marine mammals. When the predicted number of individuals to be taken is fewer than one-third of the species or stock abundance, the take is considered to be of small numbers. Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

The amount of take NMFS proposes to authorize is below one-third of the estimated stock abundance for all species (total take is less than 7.5 percent of the abundance of the affected stocks for all species, see Table 4). The figures presented in Table 4 are considered conservative estimates for purposes of the small numbers determination as they assume all takes represent different individual animals, which is unlikely to be the case.

Based on the analysis contained herein of the activity (including the mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS finds that small numbers of marine mammals would be taken relative to the population size of the affected species or stocks.

Unmitigable Adverse Impact Analysis and Determination

There are no relevant subsistence uses of the affected marine mammal stocks or species implicated by this action. Therefore, NMFS has determined that the total taking of affected species or stocks would not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence purposes.

Endangered Species Act

Section 7(a)(2) of the Endangered Species Act of 1973 (ESA; 16 U.S.C. 1531 *et seq.*) requires that each Federal agency insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated

critical habitat. To ensure ESA compliance for the issuance of IHAs, NMFS consults internally whenever we propose to authorize take for endangered or threatened species.

NMFS has authorized the incidental take of four species of marine mammals which are listed under the ESA, including the North Atlantic right, fin, sei, and sperm whale, and has determined that these activities fall within the scope of activities analyzed in GARFO's programmatic consultation regarding geophysical surveys along the U.S. Atlantic coast in the three Atlantic Renewable Energy Regions (completed June 29, 2021; revised September 2021).

Authorization

As a result of these determinations, NMFS has issued an IHA to TerraSond for conducting marine site characterization surveys in the New York Bight and Central Atlantic for a period of 1 year, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. The IHA can be found at:

<https://www.fisheries.noaa.gov/action/incidental-take-authorization-terrasond-limited-marine-site-characterization-surveys-new>.

Dated: May 15, 2023.

Kimberly Damon-Randall,

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National Marine Fisheries Service.